

## **Appendix 9**

### **Early Action Compact Regulations**



**SOUTH CAROLINA  
DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL  
AIR POLLUTION CONTROL REGULATIONS AND STANDARDS**

**REGULATION 61-62. 5  
AIR POLLUTION CONTROL STANDARDS**

**STANDARD NO. 5.2  
CONTROL OF OXIDES OF NITROGEN (NO<sub>x</sub>)**

**SECTION I - APPLICABILITY**

(a) Except as provided in paragraph (b) of this part, the provisions of this regulation shall apply to any stationary source that emits or has the potential to emit oxides of nitrogen (NO<sub>x</sub>) generated from fuel combustion that has not undergone a Best Available Control Technology (BACT) analysis for NO<sub>x</sub> in accordance with SC Regulation 61-62.5, Standard No. 7 and that meets one or more of the criteria specified in paragraphs (a)(1), (a)(2), and (a)(3) of this part:

(1) Any new source that is permitted to construct after the effective date of this regulation;

(2) Any existing source where a burner assembly is replaced with another burner assembly after the effective date of this regulation, regardless of size or age of the burner assembly to be replaced. The replacement of individual components such as burner heads, nozzles, or windboxes does not trigger the applicability of this regulation; or

(3) Any existing source that is removed from its presently permitted facility and moved to another permitted facility after the effective date of this regulation except process equipment and commercial or industrial boilers that are transferred between facilities within the state under common ownership. Such transfers will be considered as existing sources under (a)(2) above.

(b) Exemptions:

The following sources are exempt from all requirements of this regulation unless otherwise specified:

(1) Any source less than  $10 \times 10^6$  BTU/HR rated input capacity that burns a fuel.

(2) Emergency power generators of less than 150 KW rated capacity, or those that operate 250 hours per year or less and have a method to record the actual hours of use such as an hour meter.

(3) Any internal combustion engine with a mechanical power output of less than 200 bHP.

(4) Any device functioning solely as a combustion control device.

(5) Any equipment that has NO<sub>x</sub> controls pursuant to the requirements 40 CFR Parts 60, 61, or 63 where such controls are equivalent to, or more stringent than, the requirements of this regulation.

(6) Any source that has NOx controls pursuant to the requirements of SC Regulation 61-62.96, where such controls are equivalent to, or more stringent than, the requirements of this regulation.

(7) Any source that has NOx controls pursuant to the requirements of SC Regulation 61-62.99.

(8) Flares

(9) Air Curtain Incinerators

(10) Fuel Cell Sources

(11) Engines test cells/stands

(12) Portable and temporary IC engines such as those associated with generators, air compressors, or other applications provided that they fall in the categories listed in 40 CFR 89, *Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines*.

(13) Combustion sources that operate at a capacity of less than 10% per year.

(14) Special use burners, such as start-up/shut-down burners, that are operated less than 500 hours a year.

(15) Liquor guns on a recovery boiler are only exempt from the standard requirements in Section IV.

(16) Portable sources such as asphalt plants or concrete batch plants are only exempt from the standard requirements in Section III.

(17) The Department reserves the right to consider any other exemptions from this regulation on a case-by-case basis as appropriate.

## **SECTION II - DEFINITIONS**

For the purposes of this regulation, the following definitions shall apply:

**Burner Assembly:** Means any complete, pre-engineered device that combines air (or oxygen) and fuel in a controlled manner and admits this mixture into a combustion chamber in such a way as to ensure safe and efficient combustion. A self-contained chamber such as is found on a combustion turbine is not a burner assembly for the purposes of this regulation.

**Case-by-Case NOx Control:** Means an emissions limitation based on the maximum degree of reduction for NOx which would be emitted from any new source which the Department, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source through application of production processes or available methods, systems, and techniques. In no event shall application of NOx control result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard. If the Department determines that technological or economic limitations on the application of measurement methodology to a particular source would make the impositions of an emission standard infeasible, a design, equipment, work

practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of NO<sub>x</sub> control. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means, which achieve equivalent results.

**Combustion Control Device:** Means, but is not limited to, any equipment that is used to destroy or remove air pollutant(s) prior to discharge to the atmosphere, excluding boilers, process heaters, dryers, furnaces, digesters, ovens, combustors, and similar combustion devices. Such equipment includes, but is not limited to, thermal oxidizers, catalytic oxidizers, and flares.

**Constructed:** Means the on-site fabrication, erection, or installation of the NO<sub>x</sub> emitting source.

**Fuel:** Means the following or any combination of the following: virgin fuel, fossil fuel, waste, waste fuel, biomass fuel, biofuel, methanol, ethanol, biodiesel, landfill gas, digester gas, process liquid or gas, or any combustible material the Department determines to be a fuel.

**Source:** Means an individual NO<sub>x</sub> emission unit.

**Tune-up:** Means adjustments made to the combustion process to optimize combustion efficiency of the source in accordance with procedures provided by the manufacturer or in accordance with good engineering practices.

### **SECTION III – STANDARD REQUIREMENTS FOR NEW SOURCES**

(a) Those sources as defined in Section I (a)(1) and (a)(3) shall apply NO<sub>x</sub> controls capable of achieving the limitations provided in Table 1 of this section. Unless otherwise noted, all emission limits identified in Table 1 are based on monthly averages.

(b) A source may request an alternate control limitation by submitting a demonstration that the alternate limitation is a Case-by-Case NO<sub>x</sub> Control as defined in Section II.

(c) The Department reserves the right to request that the owner or operator submit additional information for those sources that request alternate control limitation in accordance with Section III (b) above.

(d) Sources required to install post combustion technology for the control of NO<sub>x</sub>, shall be required to use post combustion for the control of NO<sub>x</sub> during the ozone season (April 1 through October 31).

**Table 1 - NO<sub>x</sub> Control Standards**

<b>Source Type</b>	<b>Control Technology and/or Emission Limit</b>
<b>Boilers and Water Heaters</b>	
<b>Natural Gas Fired Boilers</b>	
≥10mmBTU/hr and < 100mmBTU/hr	Low NO <sub>x</sub> Burners or equivalent technology capable of achieving 30ppmv @ 3% O <sub>2</sub> Dry (0.036 lb/mmBTU)

$\geq 100 \text{ mmBTU/hr}$	Low NOx Burners + Flue Gas Recirculation or equivalent technology capable of achieving 30 ppmv @ 3% O <sub>2</sub> Dry (0.036 lb/mmBTU)
<b>Distillate Oil Fired Boilers</b>	
$\geq 10 \text{ mmBTU/hr}$ and $< 100 \text{ mmBTU/hr}$	Low NOx Burners or equivalent technology capable of achieving 0.15 lb/mmBTU
$\geq 100 \text{ mmBTU/hr}$	Low NOx Burners + Flue Gas Recirculation or equivalent technology capable of achieving 0.14 lb/mmBTU
<b>Residual Oil Fired Boilers</b>	
$\geq 10 \text{ mmBTU/hr}$ and $< 100 \text{ mmBTU/hr}$	Low NOx Burners or equivalent technology capable of achieving 0.3 lb/mmBTU
$\geq 100 \text{ mmBTU/hr}$	Low NOx Burners + Flue Gas Recirculation or equivalent technology capable of achieving 0.3 lb/mmBTU
<b>Multiple Fuel Boilers</b>	The emission limits for boilers burning multiple fuels are calculated in accordance with the formulas below. Additional fuels shall be addressed on a case-by-case basis.
$\geq 10 \text{ mmBTU/hr}$ and $< 100 \text{ mmBTU/hr}$	$E_n = [(0.036 \text{ lb/mmBTU } H_{ng}) + (0.15 \text{ lb/mmBTU } H_{do}) + (0.3 \text{ lb/mmBTU } H_{ro}) + (0.35 \text{ lb/mmBTU } H_c) + (0.2 \text{ lb/mmBTU } H_w)] / (H_{ng} + H_{do} + H_{ro} + H_c + H_w)$ <p>where:</p> <p><math>E_n</math> is the nitrogen oxides emission limit (expressed as NO<sub>2</sub>), ng/J (lb/million Btu)</p> <p><math>H_{ng}</math> is the heat input from combustion of natural gas,  <math>H_{do}</math> is the heat input from combustion of distillate oil  <math>H_{ro}</math> is the heat input from combustion of residual oil,  <math>H_c</math> is the heat input from combustion of coal,  <math>H_w</math> is the heat input from combustion of wood residue.</p>
$\geq 100 \text{ mmBTU/hr}$	$E_n = [(0.036 \text{ lb/mmBTU } H_{ng}) + (0.14 \text{ lb/mmBTU } H_{do}) + (0.3 \text{ lb/mmBTU } H_{ro}) + (0.25 \text{ lb/mmBTU } H_c) + (0.2 \text{ lb/mmBTU } H_w)] / (H_{ng} + H_{do} + H_{ro} + H_c + H_w)$ <p>where:</p>

	<p><math>E_n</math> is the nitrogen oxides emission limit (expressed as <math>\text{NO}_2</math>), ng/J (lb/million Btu)</p> <p><math>H_{ng}</math> is the heat input from combustion of natural gas,</p> <p><math>H_{do}</math> is the heat input from combustion of distillate oil</p> <p><math>H_{ro}</math> is the heat input from combustion of residual oil,</p> <p><math>H_c</math> is the heat input from combustion of coal.</p> <p><math>H_w</math> is the heat input from combustion of wood residue.</p>
<b>Wood Residue Boilers</b>	
All types	Combustion controls to minimize $\text{NO}_x$ emissions or equivalent technology capable of achieving 0.20 lb/mmBTU
<b>Coal Fired Stoker Fed Boilers</b>	
< 250 mmBTU/hr	Combustion controls to minimize $\text{NO}_x$ emissions or equivalent technology capable of achieving 0.35 lb/mmBTU
$\geq 250$ mmBTU/hr	Combustion controls to minimize $\text{NO}_x$ emissions or equivalent technology capable of achieving 0.25 lb/mmBTU
<b>Pulverized Coal Fired Boilers</b>	
< 250 mmBTU/hr	Low $\text{NO}_x$ Burners + Combustion controls to minimize $\text{NO}_x$ emissions or equivalent technology capable of achieving 0.35 lb/mmBTU
$\geq 250$ mmBTU/hr	Low $\text{NO}_x$ Burners + Combustion controls to minimize $\text{NO}_x$ emissions + SCR or equivalent technology capable of achieving 0.14 lb/mmBTU
<b>Municipal refuse fired boilers</b>	
< 250 mmBTU/hr	Combustion modifications to minimize $\text{NO}_x$ emissions + Flue Gas Recirculation or equivalent technology capable of achieving 200 ppmv @12% $\text{CO}_2$ (0.35 lb/mmBTU)
$\geq 250$ mmBTU/hr	Staged Combustion and Automatic Combustion Air Control + SCR or equivalent technology capable of achieving 0.18 lb/mmBTU
<b>Internal Combustion Engines</b>	
Compression Ignition	Timing Retard $\leq 4^\circ$ + Turbocharger w/ Intercooler or equivalent technology capable of achieving 490 ppmv @ 15% $\text{O}_2$ (7.64 gm/bhp-hr)

Spark Ignition	Lean Burn Technology or equivalent technology capable of achieving 1.0 gm/bhp-hr
Landfill or Digester Gas Fired	Lean Burn Technology or equivalent technology capable of achieving 1.25 gm/bhp-hr
<b>Gas Turbines</b>	
Simple Cycle – Natural Gas	
< 50 Megawatts	Combustion Modifications (e.g. dry low-NOx combustors) to minimize NOx emissions or equivalent technology capable of achieving 25 ppmv @ 15% O <sub>2</sub> Dry (0.054 lb/mmBTU)
≥ 50 Megawatts	Combustion Modifications (e.g. dry low-NOx combustors) to minimize NOx emissions or equivalent technology capable of achieving 9.0 ppmv @ 15% O <sub>2</sub> Dry (0.033 lb/mmBTU)
Combined Cycle – Natural Gas	
< 50 Megawatts	Dry Low-NOx Combustors or equivalent technology capable of achieving 9.0 ppmv @ 15% O <sub>2</sub> Dry (0.033 lb/mmBTU)
≥ 50 Megawatts	Dry Low-NOx Combustors + SCR or equivalent technology Capable of achieving 3.0 ppmv @ 15% O <sub>2</sub> Dry (0.011lb/mmBTU)
Simple Cycle - Distillate oil combustion	
< 50 Megawatts	Combustion Modifications and water injection to minimize NOx emissions or equivalent technology capable of achieving 42 ppmv @ 15% O <sub>2</sub> Dry Basis (0.16 lb/mmBTU)
≥ 50 Megawatts	Combustion Modifications and water injection to minimize NOx emissions or equivalent technology capable of achieving 42 ppmv @ 15% O <sub>2</sub> Dry Basis (0.16 lb/mmBTU)
Combined Cycle - Distillate oil combustion	
< 50 Megawatts	Dry Low-NOx Combustors with water injection, or equivalent technology capable of achieving 42 ppmv @ 15% O <sub>2</sub> Dry Basis (0.16 lb/mmBTU)
≥ 50 Megawatts	Dry Low-NOx Combustors, water injection, and SCR or Equivalent technology capable of achieving 10 ppmv @ 15%

	O <sub>2</sub> Dry Basis (0.038 lb/mmBTU)
Landfill Gas Fired	Water or steam injection or low NO <sub>x</sub> turbine design or equivalent technology capable of achieving 25 ppmv @ 15% O <sub>2</sub> (0.097 lb/mmBTU)
<b>Cement Kilns</b>	
Low NO <sub>x</sub> Burner or equivalent technology capable of achieving a 30% reduction from uncontrolled levels	
<b>Fluidized Bed Combustion (FBC) Boiler:</b>	
Coal Fired	SNCR- Urea (Selective Noncatalytic Reduction - Urea) capable of achieving 51.8 ppm @ 3% oxygen (0.07 lbs/mmBTU)
Wood Fired	SNCR- Urea (Selective Noncatalytic Reduction - Urea) capable of achieving 51.8 ppm @ 3% oxygen (0.07 lbs/mmBTU)
<b>Recovery Furnaces</b>	
4 <sup>th</sup> level or air to recovery furnace/good combustion practices or equivalent technology capable of achieving 100 ppm @8% oxygen	
<b>Lime Kilns</b>	
Combustion controls or equivalent technology capable of achieving 175 ppm @ 10% oxygen	
<b>Fuel Combustion Sources Not Otherwise Specified:</b> (Examples include but are not limited to process heaters, dryers, furnaces, ovens, duct burners, incinerators, and smelters)	
Low NO <sub>x</sub> Burners or equivalent technology capable of achieving 30 ppmv @ 3% O <sub>2</sub> Dry (0.036lb/mmBTU)	

#### SECTION IV - STANDARD REQUIREMENTS FOR EXISTING SOURCES

(a) For those sources subject to the requirements of this regulation as defined in Section I (a)(2) above where an existing burner assembly is replaced after the effective date of this regulation, the burner assembly shall be replaced with a low NO<sub>x</sub> burner assembly or equivalent technology capable of achieving a 30 percent reduction from uncontrolled NO<sub>x</sub> emission levels based upon manufacturer's specifications. An exemption from this requirement shall be granted when a single burner assembly is being replaced in a source with multiple burners due to non-routine maintenance.



(b) For those sources defined in Section I (a)(2) above where an existing burner assembly is replaced after the effective date of this regulation, the owner or operator shall notify and register the replacement with the Department in accordance with Section V below.

(c) A facility may request an alternative control methodology to the one specified in paragraph (a) of this section provided that they can demonstrate to the Department why the NO<sub>x</sub> control limits specified are not economically or technically feasible for this specific circumstance. The Department reserves the right to request that the owner or operator submit additional information as necessary for the alternative control methodology determination. Alternative control methodologies granted under this part are not effective until notification is submitted to and approved by the Department.

## **SECTION V – NOTIFICATION REQUIREMENTS**

(a) Except for those sources that wish to request an alternative control methodology as specified in Section IV(c), the notification requirements specified in this section shall apply only to existing sources as defined in Section I(a)(2) above where an existing burner assembly is replaced after the effective date of this regulation.

(b) Within 7 days of replacing an existing burner assembly, the owner or operator shall submit written notification to register the replacement unit with the Department.

(c) Notification shall satisfy the permitting requirements consistent with SC Regulation 61-62.1, Section II (a).

(d) Notification shall contain replacement unit information as requested in the format provided by the Department. Replacement unit information shall include, at a minimum, all affected units at the source and the date the replacement unit(s) will commence operation.

(e) Those sources that wish to receive an emission reduction credit for the control device will be required to submit a permit application.

## **SECTION VI – TUNE-UP REQUIREMENTS**

(a) Owners or operators of a combustion source shall perform tune-ups every two years in accordance with manufacturer's specifications or with good engineering practices.

(b) All tune-up records are required to be maintained on site and available for inspection by the Department for a period of five years from the date generated.

(c) The facility shall develop and retain a tune-up plan on file.

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**SOUTH CAROLINA  
DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL  
AIR POLLUTION CONTROL REGULATIONS AND STANDARDS**

**REGULATION 61-62.2  
PROHIBITION OF OPEN BURNING**

**OPEN BURNING IS PROHIBITED EXCEPT AS PROVIDED BELOW:**

**SECTION I - Exceptions**

A. Open burning of leaves, tree branches or yard trimmings originating on the premises of private residences and burned on those premises.

B. Open burning in connection with the preparation of food for immediate consumption.

C. Campfires and fires used solely for recreational purposes, ceremonial occasions, or human warmth. Fires set for the purpose of human warmth must use only clean wood products (woody vegetation, leaves, or wood which is not coated with stain, paint, glue or other coating material, and not treated lumber).

D. Fires purposely set ~~to forest lands for specific management practices in accordance with guidelines acceptable to the Department and as~~ *Smoke Management Guidelines for Vegetative Debris Burning Operations in South Carolina*, administered by the South Carolina Forestry Commission and acceptable to the Department. ~~Such Management practices shall include~~ to include the following:

1. Prescribed burning ~~of forest lands for specific management practices under existing standards for various management objectives; and~~

~~2. Site preparation burning for purposes of clearing an area for regeneration.~~

~~E-2.~~ 2. Fires purposely set for agricultural control of diseases, weeds, pests, and for other specific agricultural purposes ~~in accordance with practices acceptable to the Department of Health and Environmental Control.~~

~~F 3.~~ 3. Open burning of trees, brush, grass and other vegetable matter for game management purposes ~~in accordance with practices acceptable to the Department of Health and Environmental Control.~~

~~G E.~~ E. Open burning in areas other than predominantly residential for the purpose of land clearing or right-of-way maintenance. This will be exempt only if the following minimum conditions are followed:

1. The location of the burning must be a sufficient distance but not less than 1000 feet, from public roadways and all residential, commercial, and industrial sites not a part of the contiguous property on which the burning is conducted.

2. Winds during the time of the burning must be away from any area in which the ambient air may be significantly affected by smoke from the burning if that area contains a public roadway or a residential, commercial, or industrial site.

3. The material to be burned must have been generated onsite and not moved to the site from another location;

34. The amount of dirt on the material being burned must be minimized;

45. No heavy oils, asphaltic materials, items containing natural or synthetic rubber, or any materials other than plant growth may be burned;

56. The initial burning must be started only between the hours of 9:00 a.m. and 3:00 p.m.; no combustible material may be added to the fire between 3:00 p.m. of one day and 9:00 a.m. the following day;

67. No more than two piles 30' x 30' or equivalent may be burned within a six-acre area at one time; and

78. In the case of land clearing, all salvageable timber and pulpwood must be removed.

~~HF.~~ Fires set for the purposes of training public fire-fighting personnel ~~when authorized by the appropriate governmental entity, and fires are set by a private industry, with prior Department approval, as a part of an organized program of drills for the training of fire fighting personnel. These will be exempt only if the drills are solely for the purpose of fire fighting training and the duration of the burning is held to the minimum required for such purposes. Prior approval is required only for sites which are not established training sites.~~ and conducted at permanent fire-fighter training facilities. Prior Department approval is required in order to obtain the exemption as a permanently established training site. Fires set for the purpose of fire-fighter training at non-permanent locations must receive Department approval prior to the initiation of any burning activity. Materials used for fire-fighter training cannot contain asbestos, heavy oils, asphaltic material, plastic or rubber without express written consent from the Department.

~~I. Open burning of household trash on the premises of and originating from private residences where services for the disposal of such materials are not available. The location of such burning must be at least 500 feet from any inhabited building.~~

~~JG.~~ Open burning on the property where it occurs of residential construction waste from building and construction operations will be exempt only if the following conditions are met:

1. The material being burned is residential construction waste associated with the building and construction of one and two family dwellings only;

42. The location of the burning is at least five hundred (500) feet from any occupied structure other than a dwelling or structure located on the property on which the burning is conducted;

23. Heavy oils, treated wood products, asphaltic materials, items containing natural or synthetic rubber, or any other trade wastes which produce smoke in excess of forty (40) percent opacity are not burned; and

4. The burning does not occur during the ozone season (April 1 through October 30); and

35. The burning is conducted only between the hours of 9:00 a.m. and 3:00 p.m.;

KH. Open burning, in remote or specified areas:

~~1. Of trade waste provided the burning is conducted in accordance with Paragraph G of this regulation. Such burning must be of a non-recurring nature.~~

2 1. For non-recurring unusual circumstances.

3.2 For experimental burning for purposes of data gathering and research.

However, prior approval for these types of burning (in subparagraph KH above) must be obtained from the Department.

## **SECTION II - General**

A. A written report or warning to a person of a violation at one site shall be considered adequate notice of the Regulation and subsequent observed violations at the same or different site will result in appropriate legal action.

B. Open burning may be conducted in certain situations if no undesirable levels are or will be created. The authority to conduct open burning under this Regulation does not exempt or excuse the person responsible for the burning from the consequences of or the damages or injuries resulting from the burning and does not exempt or excuse anyone from complying with other applicable laws and with ordinances, regulations, and orders of governmental entities having jurisdiction, even though the burning is otherwise conducted in compliance with this Regulation.

C. The Department reserves the right to impose other or different restrictions and exemptions on open burning in addition to those enumerated above, whenever in the judgment of the Department such is necessary to realize the purpose of this Regulation.